

Electrochemical Capacitor Development for Pulsed Power Communications, Phase II

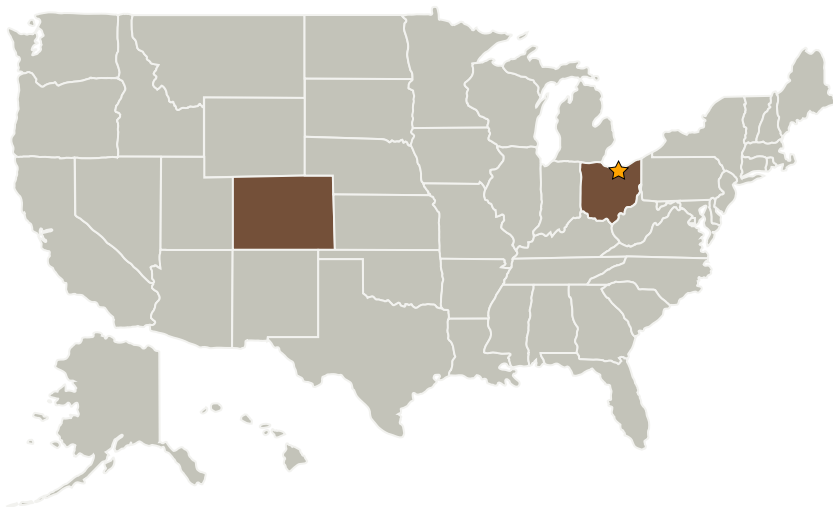
Completed Technology Project (2009 - 2011)



Project Introduction

In this NASA Phase II SBIR Project, we will continue the development of graphitic nanosheets (GNS) for electrochemical capacitor (EC) electrode materials. In the Phase I project, treatments of the electrode materials resulted in increases of relative capacitance (2x), relative energy (4x), and relative power (25%). These results surpassed those of commercially available ECs for relative power and will fulfill NASA's need for energy storage materials for communications and navigation. We will address the following in the Phase II program: (1) Increase performance through exfoliation, activation, and other surface treatments; (2) Use these materials as supports for the deposition of pseudocapacitive species to form a nanocomposite electrode; (3) Improve the test cell fabrication to decrease equivalent series resistance (ESR) and passive layer formation; (4) Purify electrode materials and electrolyte to decrease leakage current and self-discharge; (5) Perform environmental testing including temperature, pressure, and vibration; (6) Fabricate, test, and deliver functional prototype cells to NASA at the end of the Phase II project. This technology is currently at a TRL of 3-4 and we expect to achieve a TRL of 5 with delivery of prototype cells to NASA for testing.

Primary U.S. Work Locations and Key Partners



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Transitions	2
Project Management	2
Technology Areas	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Eltron Research & Development, Inc.	Supporting Organization	Industry	Boulder, Colorado

Primary U.S. Work Locations	
Colorado	Ohio

Project Transitions

**February 2009:** Project Start**August 2011:** Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.1 Materials
 - └ TX12.1.6 Materials for Electrical Power Generation, Energy Storage, Power Distribution and Electrical Machines